



STATE OF MONTANA

## DEPARTMENT OF STATE LANDS

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January 6, 1976

PLEASE RETURN

Decker Coal Company's West Decker mine is located in Big Horn County, Montana. Initial mining of coal at this site began on August 22, 1972.

Attached is a Preliminary Environmental Review (P.E.R.) for the proposed approval of an amendment to the Decker Coal Company's 1975 mining permit (75001 - A002). The permit amendment essentially converts 113.4 acres additional acres to active mining. This review assesses the updated information and changes submitted by the Company since the distribution of the Department's addendum to the Environmental Impact Statement (E.I.S.) for the West Decker mine. The Department's addendum was issued on June 6, 1975, and covered Decker Coal Company's 1975 permit application. A draft E.I.S. was issued on November 11, 1973 and assessed the Company's 1974 permit application.

This review indicates that the issuance of an amended permit to the Decker Coal Company does not constitute an action which might significantly affect the quality of the human environment and therefore a draft E.I.S. will not be issued by the Department. This document is being distributed in accordance with the proposed rules implementing the Montana Environmental Policy Act (Chapter 65, Title 69 R.C.M. 1947). This amendment to Decker Coal Company's 1975 mining permit is scheduled to be issued in the near future.

All materials submitted to the Department by the Decker Coal Company as part of their application for a permit pursuant to the requirements of the Montana Strip Mining and Reclamation Act (Chapter 10, Title 50, R.C.M. 1947) are on file and available for public review in the Department's offices in Helena.

Sincerely,

STATE DOCUMENTS COLLECTION

*Brace Hayden*

JUL 13 1979

Brace Hayden  
Environmental Coordinator

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PRELIMINARY ENVIRONMENTAL REVIEW

Proposed Approval of an Amendment to Decker Coal Company's  
1975 Mining Permit

Submitted Pursuant to the Montana Environmental Policy Act  
Section 69-6504(b)(3) R.C.M. 1947

Prepared by  
Montana Department of State Lands

**PLEASE RETURN**

Helena, Montana  
January 6, 1976

WALTER 30A3.9

## 1. Introduction

On October 16, 1975 the Decker Coal Company submitted an application to amend the 1975 Surface Mining Permit for their West Decker Mine.\* The company seeks approval to strip mine an additional 113.4 acres in areas contiguous to the existing mine. The amended acreage may be broken into 5 segments each of which are shown on the permit map on the following page.

- 1) An extension of the scraper pit to the North of the existing scraper pit in Section 15 (31.66 acres).
- 2) An additional pit located parallel to the existing pit in Sections 16 and 21 (32.77 acres).
- 3) An area in the S.E. corner of the mine (33.60 acres).
- 4) An extension of the dragline ramp in the N.W. corner of the mine (3.88 acres).
- 5) A new scoria pit in Section 15 (11.46 acres).

In addition to the 113.4 acres proposed for active mining, the Company is also requesting Departmental approval for new roads, new topsoil stockpile locations, and new surface water diversion ditches within the areas previously permitted as associated disturbance. Finally, the company requests that the buffer zone west of Highway 314 at the site of the proposed access road in Section 22 be waived to allow for construction of the proposed new access road in that area.

Decker is seeking the permit amendment for several reasons.<sup>(1)</sup> Production rates have outstripped the coal available in previously permitted areas. Also there is a need to square up the box cut so that the company can operate more

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\*The existing Decker mine is referred to as the West Decker Mine in order to distinguish it from the proposed North Extension to the West Decker Mine and the proposed East Decker Mine.



efficiently under their 1975 annual permit. The extension of the scraper pit is proposed because the scraper pit location is in a "low overburden" area and the coal is therefore easily attainable. The company contends that they need a place to mine coal in a hurry in order to maintain contract obligations in the event of equipment breakdowns. Lastly, the scoria pit is proposed in order for the company to have an additional source of material for haul road surfacing.

## 2. History

Decker Coal Company's mining operation began on August 22, 1972 under a Surface Coal Mine Land Reclamation Contract, issued by the Montana Bureau of Mines and Geology. Prior to this contract, a test pit had been opened up at the Decker site in 1970.

Since the implementation of the Montana Strip Mining and Reclamation Act in 1973, (Chapter 10, Title 50 R.C.M. 1947) the Decker Coal Company has received 5 mining permits and/or permit amendments from the Department for their West Decker Mine. These 5 permits total 3134.5 acres, approximately 600 of which are for mining, spoiling and topsoil removal. The remaining acreage covers facilities, roads, railroad loops, and associated mining related disturbances. The 113.4 acres requested in the proposed permit amendment was previously permitted as part of this associated mining disturbance.

Annual production at the West Decker Mine is shown below:

<u>Year</u>	<u>Tonnage</u>
1970	75,000
1972	793,000
1973	4,159,000
1974	6,874,000
1975	9 million (approximate)
1976	8-10 million (projected)









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### 3. Location

The existing Decker Mine and the requested amendment area are located in BigHorn County approximately 8 miles north of the Wyoming-Montana state line. The legal description of the mine site and associated disturbances are sections 8, 9, 10, 15, 17, 21 and 22, T9S, R40E, Montana Principal Meridian. Primary access to the mine site is Federal Aid Secondary Highway 314.

### 4. Mining Plan

The Decker mine pit layout is shown on the "permit map" (p.3). Overburden is stripped with a "walking" dragline except in those areas where scrapers are utilized. Where overburden is 40 feet or less, it is removed by the dragline in one lift. Where overburden is over 40 feet, it is removed in 2 lifts to facilitate increased dragline production. Scrapers may assist the dragline in areas of higher overburden. Overburden material with high sodium absorption ratio (S.A.R.) values immediately above the coal (1 to 3 feet thick) will not be placed on top of the spoils as normal stripping practices would dictate. The dragline will swing past 90<sup>0</sup> to place this material ahead of the spoil in the bottom of the pit or on the previously placed top lift as the case may be. This practice will allow 35 feet or more of material to be placed on top of the higher SAR material.

Detailed mining plans and diagrams of overburden handling are included in Decker Coal Company's 1975 annual permit application on file with the Department.

### 5. Alternatives to the Proposed Action

Denial of the permit amendment could mean that the Decker Coal Company would continue to mine under their 1975 and earlier permits. Denial however would place the company in the position of having to curtail production and therefore possibly not fulfill coal contract obligations. Furthermore without

an expanded scraper pit, the Company would be forced to realize the diseconomy of uncovering greater quantities of the thicker overburden material.

Assuming no further permits were issued, mining at the West Decker site would eventually be forced to cease. Decker Coal Company's analysis for the West Decker Mine<sup>(2)</sup> indicated the following as some of the effects of such a shutdown:

1. Electrical generating stations in the midwest would have to find other sources of low-sulfur coal.
2. Income and employment for Decker and railroad personnel would not continue.
3. Tax revenues generated from West Decker production would be discontinued.
4. Present adverse impacts on land form, soils, geology etc. would cease and the company would be required to start reclamation efforts immediately.
5. Further loss of wildlife habitat and grazing would not occur; further alternations in groundwater levels, and water quality would not occur.
6. Further consumption of water, electricity and fuel oils at the West Decker Mine would cease; depletion of coal reserves at the West Decker site would discontinue.

Alternative forms of coal mining at the West Decker site are adequately discussed in the Company's analysis for the West Decker Mine.<sup>(2)</sup>

The Department of State Lands has determined that the mining and reclamation plans submitted (or referenced) as part of this amended permit application sufficiently comply with the Montana Strip and Underground Mine Reclamation Act. Alternative plans therefore are not required from the Company for this permit amendment.

## 6. Impacts on the Physical Environment

### a. Terrestrial and aquatic life and habitats

A preliminary wildlife survey of the Decker mining area was conducted

by the Montana State University Agricultural Experiment Station in the late summer and fall of 1973.<sup>(3)</sup> This study consisted mainly of a species list of indigenous wildlife in and around the mine area plus a list of species possibly residing in or utilizing the area.

In January 1974, in-depth wildlife inventory and monitoring studies were initiated by the Decker Coal Company. Information collected from January 1974 through September 1974 was included in a report received by the Department in October of 1974.<sup>(4)</sup>

Decker Coal Company's amended permit application contains wildlife information gained from October 1974 through October 1975 for the West Dekcer Mine site.

The amendment application updates previous studies as follows:

"Material gathered from October, 1975, to October, 1975, shows an increase in deer numbers inside the mine area to 23 animals which occurred from February through May of 1975. Adjacent populations increased to 25 mule deer and occurred in April of 1975. Up to 23 mule deer were counted around the reclamation research area from February to May.

"During the 1974 field season, four sightings of four separate antelope were recorded within the mine boundary and all occurred to the west of the mine during the spring fawning period. In the spring of 1975, antelope were again observed in the Pond Creek drainage inside the mine boundary but activity continued to increase through the summer. Observations since May of 1975 show an average population of 9 to 12 antelope in the immediate mine area. These antelope use the perimeter area to the west and north of the mine."

The amendment application cites three possible reasons for the observed increase in mule deer and antelope use within the mining area.

- (1) Increased vegetation distribution, production, and diversity due to above normal spring moisture.
- (2) Increased vegetation diversity, density and production within the mine boundary due to lack of grazing for the past three years.
- (3) Acclimation to mine disturbance and associated activity.

Lack of hunting pressure in the mining area may also have influenced the distribution of mule deer and antelope.



Studies conducted since January, 1974 show areas proposed for addition to the mine in the requested amendment do not sustain any heavier wildlife use than the remainder of the mine area.<sup>(5)</sup>

Strip mining and other disturbances in the amended permit area will result in at least temporary loss of food and cover for many species. The quality of the habitat for most species will be further reduced by increased human intrusions into areas adjacent to the mine site, increased noise, and by new roads. The duration of such a decline in quality depends upon the success of reclamation and upon the individual species ability to tolerate the increased presence of man.

Strip mining in the amended area will also shift wildlife use to adjacent areas, including acreage being reclaimed or that which is utilized as reclamation research plots. The amendment application points out that such plots were fenced in July, 1975 to alleviate mule deer damage.

The capability of the regraded topsoiled spoils to support vegetation, the availability of suitable species, future precipitation patterns and other factors will determine whether the amended area can be reutilized as quality wildlife habitat. Initial reclamation efforts have had variable results and because the mine is relatively new, these results are difficult to extrapolate over an extended period of time.

The amended permit area and existing mine interrupt Pond Creek, a tributary of the Tongue River. Since Pond Creek is ephemeral, no significant fisheries exist within the West Decker Mine area. The Tongue River and Tongue River Reservoir however are in close proximity to the mine. To date, no significant impacts of mining on the reservoir or downstream fisheries have been observed.

In the spring of 1975, the Montana Fish and Game Department initiated intensive fisheries management survey for the Tongue River and Tongue River Reservoir. In addition, the Montana Fish and Game Department is currently making a detailed limnological study of the reservoir. Results of these two studies will be presented in future Department of State Lands' impact statements for Decker area strip mines.

b. Water quality, quantity and distribution

The Decker Coal Company proposed to construct new surface water diversion ditches as shown on the permit map (p. 3). Water disturbed by mining will be impounded and treated in existing facilities as necessary to meet applicable water quality standards.<sup>(5)</sup>

It is doubtful that the mine extension will significantly impact the already stressed hydrologic system. It is also unlikely that the mine expansion will significantly impact the Tongue River or Tongue River Reservoir, through discharge of undesirable waters from the settling ponds.

Discharge from the existing settling pond flows into the Tongue River. This discharge is permitted by the Montana Department of Health and Environmental Sciences. In quarterly reports beginning on April 1974, Decker Coal Company has reported one very minor water quality violation of the limits of their permit.<sup>(6)</sup> Compliance monitoring by the State Department of Health and Environmental Sciences have found no water quality violations during this period.<sup>(6)</sup>

Two recent reports by the Montana Bureau of Mines and Geology discuss the hydrologic conditions at the Decker Mine.<sup>(7, 8)</sup>

The following information is drawn from these two reports:

Aquifers that supply water for local use (stock and domestic) in the Decker area are deposits of alluvium beneath the Tongue River flood plain; clinker from burned coal beds; and the coal seams (including both the D-1 and D-2 beds).

Water quality analyses from wells in the Decker area show a wide range of concentration of most constituents. Dissolved solids are found in concentrations between 500 and 5,000 mg./l. Sodium is the main cation and bicarbonate is the principle anion.

Mining during the past 3 years has resulted in the following changes:

(1) Water levels in observation wells have declined more than 10 feet within  $1\frac{1}{2}$  miles west of the mine with other wells varying depending on their relative distance from the existing mine and the changing geometry of the mined area. Water level declines east of the mine have been less because of recharge induced from the Tongue River Reservoir. Water levels in the D-2 aquifer have also dropped. Until early 1974, water levels declined at constant or increasing rates. Rates of decline began to diminish by early 1974 as the system began to approach a new equilibrium. Future water-level declines are not expected to be as severe as previous declines.

(2) Water quality of the mine effluent, which is a combination of ground and surface waters, is similar chemically to waters sampled from local wells. Concentrations of dissolved solids and most major constituents have decreased gradually with mining. High sulfate and nitrate explosives are dissolved from highly soluble ammonium compounds in the overburden or coal, respectively. Dissolved solids, bicarbonate, sodium, and sulfate concentrations have reduced by approximately 40% since mining began in 1972.

(3) Water in spoils has different chemical characteristics than waters in undisturbed materials because chemical constituents are made more readily available for dissolution as the overburden is stripped and replaced in an unstratified condition. Overburden ground water has been sampled at two wells in the spoils and has shown much greater sulfate and dissolved solids concentrations than other local waters. Calcium, magnesium, potassium and manganese had greater concentrations in the spoils waters and SAR values were greater than those of the mine effluent but less than those of most ground waters sampled from wells in the area.

The Montana Bureau of Mines and Geology summarizes the effects of additional mining at the West Decker site as follows:<sup>(8)</sup>

Continued development at the Decker mine will cause continued hydrostatic pressure declines such as those observed during the first years of mining. The original prediction (Van Voast, 1974) that final declines will be about twice those that occurred after one year still seems reasonable. Impact of the pressure declines as reflected by lower water levels should be significant only to the wells in Section 21, T9S, R40E. Some lowering of water levels will occur in other wells, but they probably will not be sufficient to reduce the yields of the wells.

Concentrations of chemical constituents in Decker mine effluent will probably continue to gradually diminish, but not greatly below present levels.



Value of the reservoir water (Tongue River) for irrigation and fish and wildlife will not be impaired by the post-mining waters. No reasonable final use of the mined areas will create significantly different final hydrogeologic donations.

The Bureau of Mines qualifies the report with this statement:<sup>(8)</sup>

Post mining hydrologic conditions predicted in this report are based upon some very preliminary concepts and data but are the best that can be presented with current knowledge.

c. Soils and overburden

A detailed soils survey, which included the amended permit area, was submitted as part of the Decker Coal Company's 1975 annual permit application. This survey shows that soils in the amended permit location are typical of the area; topsoil salvage depths vary, with an average of 20 inches being salvagable from the mine area.

An additional 113.4 acres will be disturbed by mining in the amended permit area. The original soil profiles will be disrupted and when the area is retopsoiled, mixing of the original soils will have occurred. Such mixing will result in a reduction in organic matter in the soil surface, modification of soil biota, and changes in bulk density, porosity, slope gradient and soil chemistry. Since vegetation is strongly related to topo-edaphic characteristics, post mining vegetation would not be divided into the ecologically distinct communities currently found on the amended permit area.

Data on two (2) new core holes have been submitted to the Department with the amended permit request. One is located in the amended area in the SE corner of the mine and the other in the proposed extension of the scraper pit. (See permit map, p. 3). Analyses of these holes are included in Appendix I. Test results show that the overburden in the amended permit area is not significantly different from overburden in areas previously permitted at the Decker mine.



Considerable controversy however, exists concerning the suitability of Decker overburden material for revegetation. The Department's E.I.S. prepared for Decker's 1975 annual permit reviews these revegetation problems at length. Listed in this E.I.S. are the Decker soil problems identified by several soils experts: Ph, sodium absorption ration (SAR), electrical conductivity, particle size distribution, and the high percentage of montmorillonite clays. Recognizing these potential problems, the Department, in granting Decker's 1975 mining permit, required that the following conditions be met.<sup>(9)</sup>

(1) Decker Coal Company shall secure unmined overburden strata samples from the two (2) core hole sites located near opposite ends of the pit. The samples should be properly labeled as to hole identification, strata location and sample depth. Send the samples to Dr. M. G. Klages of Montana State University for laboratory testing and evaluation test for total clay and DTA or X-ray defraction for quantitative clay mineralogy analysis.

Special spoil handling procedures may be required based on completion and evaluation of clay mineralogy and associated texture and permeability relationships.

(2) Decker Coal Company shall grade all present ungraded spoils and future spoils to a level configuration with the maximum allowable slope no greater than four percent (4%). Grading shall be kept current with the law and reclamation plan.

Soil surveys indicate that only twenty inches (20") of topsoiling materials are available for distribution on an average.

Erosion hazards increase as slope increases. Since high sodium spoils underlying the topsoiling materials, it is imperative that erosion be reduced as much as possible. The effectiveness of the limited topsoiling material supply is drastically increased as slopes are reduced.

(3) Decker Coal Company shall incorporate a program of chemical leaching in a portion of those areas proposed for 1976 reclamation as shown on Decker's mine reclamation map dated August 23, 1974. The leaching demonstration shall encompass four (4) plots or five (5) acres each in size. Three (3) plots shall be irrigated and shall involve applications of (2) Calcium Chloride ( $\text{CaCl}_2$ ); (2) Gypsum ( $\text{CaSO}_4$ ); and (3) A water only control plot. The fourth plot shall not be irrigated. It will be re-claimed in line with the reclamation plan and the supplemental requirements of this permit.

The Department will consult with Decker Coal Company and Mandan Agricultural Research Service in determining plot specifications, design, location and demonstration techniques, approaches, instructions and procedures.

(4) Decker Coal Company shall salvage all available and suitable topsoil and topsoiling materials. The initial soil surveys indicate an average of twenty inches (20") for redistribution over graded spoils; however, if soil salvage operations reveal additional suitable materials they shall be salvaged for redistribution.

(5) Decker Coal Company shall contour rip all graded spoils immediately prior to the redistribution of topsoiling materials. This will break up surface crusting and should promote root penetration, spoil permeability (enhancing moisture penetration and storage), and leaching of sodic conditions to lower depths.

(6) Decker Coal Company shall resubmit a final graded contour map reflecting the level to four percent (4%) slope configuration required by the Department.

(7) Decker Coal Company's total reclamation bond shall be retained by the Department and no releases made until vegetative performance is judged successful under the Act.

In addition a committee has recently been established by the Board of Land Commissioners to draft rules and regulations for the handling of sodic spoils. The committee consists of members of the State University System, Federal Resource Agencies, the Coal Industry and one farmer-rancher.

d. Vegetation cover, quantity and quality

Decker Coal Company's amendment application lists three main vegetation types in the mine area: (1) Midshort grass prairie, (2) Sagebrush steppe, and (3) Riparian shrub grassland. Distribution of these types is controlled by several factors with topo-edaphic factors exhibiting the most pronounced effect. The vegetation map on the following page shows the distribution of the types in the mine area and Appendix II lists frequency and canopy coverage by species for each type.





DECKER COAL CO.  
DECKER, MONT.  
"1975 ANNUAL PERMIT MAP"- 75001-A002

# VEGETATION MAP

## LEGEND

- SAGEBRUSH STEPPE
- MID-SHORTGRASS PRAIRIE
- RIPIARIAN SHRUB GRASSLAND
- FONDEROSA PINE JUNIPER
- GRASSLAND SAGEBRUSH
- RECLAIMED & IMPROVED PASTURE
- MINING AREA

I, THE UNDERSIGNED HEREBY CERTIFY THAT THE MAP IS A TRUE AND CORRECT COPY OF THE ORIGINAL MAP AS SUBMITTED TO ME BY THE DECKER COAL CO. AND THAT I HAVE NOTED THE INFORMATION REQUIRED BY THE STATE MINING CODE OF THIS STATE.

JACK W. REED, P.E., CLU  
NOTARY PUBLIC

SUBSCRIBED AND SWORN TO BEFORE ME THIS 10th day of 1975.

NOTARY PUBLIC FOR THE STATE OF MONTANA  
RESIDING AT SHERIDAN, MONTANA  
MY COMMISSION EXPIRES March 31, 1977









The proposed amendment will destroy an additional 113.4 acres of existing native vegetation from the mine area. Decker Coal Company's reclamation plan calls for seeding of the area with predominately native species adaptable to the area. The capability of the Decker mine area to recover and support native vegetation over the long term after mining has been debated and has led to the implementation of several research projects.

The Montana Agricultural Experiment Station began research efforts at the West Decker Mine during summer, 1973 and recently summarized their findings as follows:<sup>(10)</sup>

(1) Of 1971 seeding attempts, only a limited number of species were capable of establishing themselves successfully with 10-15 centimeters of topsoil over spoil materials. Wheatgrasses, several legumes and greasewood were the most successful species. Summercypress and annual saltbush invaded the plots. The failure of the species to become established was attributed to a combination of saline-alkaline soil, drought conditions, and relatively poor site preparation.

(2) Varieties of crested wheatgrass demonstrated favorable establishment at the mine.

(3) In a scoria shrub seeding study four wing saltbush and greasewood responded better than twelve other shrub species seeded.

(4) Seeding areas spoils with seven different annual grasses was not effective in stabilizing spoil slopes.

The U.S. Forest Service has also established research plots at Decker. In reporting their first year results, the Forest Service concluded:<sup>(11)</sup>

There are no indications that the raw overburden had any adverse effects on either seed germination or seedling emergence.

On the basis of dry-weight production, several treatments yielded grass stands capable of adequately protecting the spoil material against either water or wind erosion.

All of the subplots located on the top-dressed soil yielded acceptable stands.

To date, these two studies have yielded variable results. Differences may be partly attributable to variations in the chemical and physical characteristics of the overburden and soils.

Packer, 1974<sup>(12)</sup> summarizes the rehabilitation potential of the Decker mine and similar sites as follows:

Results show that: (1) establishment of vegetation is likely to be fair to poor in the absence of mulching to conserve soil moisture, phosphorus and nitrogen to stimulate growth, and irrigation and gypsum to counteract the adverse physicolgical effects of large amounts of sodium; (2) introduced grass species produce the greatest volume during the first year, but native species produce suprisingly more than had been expected; and (3) more research time is needed on the Decker mine before the stability and permanency of planted vegetation can be evaluated.

e. Aesthetics

The addition of 113.4 strip mined acres to the already permitted area will have a cumulative aesthetic effect as the size of the Decker mine will be enlarged. The aesthetics of the Decker vicinity will be further degraded if other proposed strip mines are approved in the area. Regrading, recontouring, and revegetation may eventually return the overall visual effect.

f. Air quality

Air quality will be adversely affected by a combination of exhaust emissions, road dust, particles from blasting, dust from spoil and topsoil piles, and coal dust from handling and shipping. These effects will be partially mitigated by

watering roads, temporarily seeding topsoil stockpiles and spoils and wetting coal after crushing with a mixture of water and detergent.

g. Unique, endangered, fragile or limited environmental resource

The Department has determined that the amended area does not possess special, exceptional, critical, or unique characteristics as defined in Section 9(2) of the Montana Strip and Underground Mine Reclamation Act.

h. Historical and archaeological sites

There is no evidence that significant historic and archaeological qualities exist in the area. Reports describing the archaeology and history of the mine area, submitted as portions of earlier Decker mining permits, are on file in the Department's offices in Helena and Billings.

i. Demands on environmental resources of land, air and water and energy

As new permits facilitate the expansion of the Decker mine, lands that were formally utilized for livestock grazing will be temporarily lost. The acreage of land included in this permit amendment was already removed from grazing usage as it had been fenced as part of Decker's "associated disturbance" area adjacent to the active mine site. If successful reclamation is not accomplished, the surface utility of the mined land will have been relinquished for mineral production.

No new power lines are required by this expansion of the West Decker Mine. Current annual electrical consumption by mine equipment totals 22 million kilowatt hours.<sup>(1)</sup>

No significant demands are anticipated on water and air resources as a result of the amended permit proposal.



## 7. Impacts on the Human Environment

### a. Tax revenues

The West Decker Mine provides considerable income to the State of Montana and to Big Horn County in the form of both royalties from state coal leases and from tax revenues. Tables 1 and 2 below give past, present, and future tax revenues originating from the production at the West Decker Mine. Estimates for 1976, 1977 and 1978 are based on the assumption that the 1975 amended permit and future permit or permit amendments are approved. Not included in the tables are rail taxes, corporate license taxes, or employment security taxes.

Approval of the amendment reduces the chance of a reduction in tax revenue flow to the State of Montana and to Big Horn County.

Table 1, State Royalties and Severance Taxes - West Decker Mine

	<u>TONNAGE</u>	<u>ROYALTIES</u> <sup>(1)</sup>	<u>SEVERANCE</u> <sup>(2)</sup>
1970	75,000	11,000	
1971			
1972	793,000	24,000	79,000
1973	4,159,000	439,000	1,183,000
1974	6,874,000	834,000	2,748,000
1975 (3 quarters)	6,830,000	538,000	5,092,000 <sup>(3)</sup>

(1) Montana Department of State Lands, Land Administration Division.

(2) Montana Department of Revenue, Miscellaneous Tax Division.

(3) The new coal severance tax, effective July 1, 1975, provides revenues for the state general fund and to eight other funds. The Decker Coal Company paid in excess of 3.1 million dollars in severance taxes for the first quarter after the new severance tax became effective.

Table 2. Estimated Future Taxes - West Decker Mine<sup>(1)</sup>

	<u>PROPERTY</u> <sup>(2)</sup>	<u>GROSS REVENUE</u> <sup>(3)</sup>	<u>RESOURCE INDEMNITY</u> <sup>(4)</sup>	<u>SEVERANCE</u>
1975	PAID <sup>(5)</sup>		200,000	4,500,000
1976	150,000	2,100,000	235,000	16,000,000
1977	150,000	1,900,000	214,000	
1978	230,000	1,900,000	225,000	16,000,000
1978 <sup>(6)</sup>	PAID	1,800,000	200,000	14,000,000

(1) Estimates provided by the Decker Coal Company

(2) Mostly to the county. As a rule of thumb, 98% of all property taxes go to local governments.

(3) Basically a property tax to the county.

(4) To the State.

(5) \$391,459 paid through December 31, 1975.

(6) Estimated 1978 tax payments for the proposed East Decker Mine.

#### b. Employment, income, and housing

Approval of this amended permit application will not add to the current West Decker work force. The Decker Coal Company currently employs 267 persons at the West Decker Mine.<sup>(1)</sup> The current payroll of persons employed at the mine is approximately 4.65 million dollars annually.<sup>(1)</sup>

Nearly all of the West Decker Mine employees live in the town of Sheridan, Wyoming, approximately 20 miles southwest of the mine. Because the mine expansion will not add to the work force, no housing problems resulting from expansion are anticipated.

#### c. Social structure and mores

No additional social effects other than those discussed in previous published studies<sup>(13, 14, 15, 16)</sup> are anticipated by approval of this amendment. The social, economic, and demographic impacts of the two proposed new Decker mines will be thoroughly discussed in future Departmental impact statements.

d. Agricultural production

Since the amended area is already withdrawn from agricultural usage (primarily grazing), approval of the amendment would have no significant effect on the agricultural land base for Big Horn County. If reclamation is successful on this and other portions of the West Decker Mine, the cumulative impacts on agricultural production should be insignificant.

e. Transportation and traffic

Since the expansion to the West Decker Mine will not add to the number of mine employees, increased traffic flows in the area of the mine are not expected.

8. Compilation and Writing of the P.E.R.

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Providing critical review were members of the Department's Reclamation Division and the Commissioner. The assistance of Mr. Jack Reed, Chief Reclamation Engineer, Decker Coal Company and Ms. Pam Crocker and Anne Jensen, typists, is appreciated.

## 9. References Cited

1. Personal communication with Jack Reed, Chief Reclamation Engineer, Decker Coal Company - December 23, 1975 and December 31, 1975.
2. VTN Environmental Sciences 1973 Environmental Analysis Decker Coal Company Mine Decker, Montana, prepared for the Montana Department of State Lands Sheridan, Wyoming 307 pp.
3. Montana Agricultural Experiment Station, 1975, Preliminary Wildlife Survey of Proposed Mining Area prepared for the Decker Coal Company M.A.E.S. Bozeman, Montana unpagd.
4. Decker Coal Company Wildlife Survey Report Decker Mining Area received by the Department of State Lands October 29, 1975 26 pp. + Appendices.
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APPENDIX I

ANALYSES OF OVERBURDEN





Peter Kiewit Sons' Co. Mining District  
Report of Laboratory Soil Analysis

Lab. No's. \_\_\_\_\_ Date 9/75 Name \_\_\_\_\_ Decker Coal Address \_\_\_\_\_

Comments \_\_\_\_\_

Sample No.	Sample Interval	pH		Soluble Salts ECx10 <sup>-3</sup>	Sodium meq l	Calcium meq l	Magnesium meq l	SAR	Texture				Satur- ation %	
		Paste	1:5 Diln.						very fine sand	% sand	% silt	% clay		Class
75-18	0-5	8.79	9.67	1.09	16.07	0.63	0.35	22.9		43.2	23.6	33.2	clay loam	59.8
	5-11.9	8.92	9.69	0.74	7.57	0.47	0.14	13.7		12.8	44.4	42.8	silty clay	85.0
	11.9-14	8.85	9.62	0.73	6.97	0.41	0.17	12.9		11.0	47.6	41.4	silty clay	83.9
	14-15.2	8.77	9.52	0.83	7.70	0.57	0.14	12.9		10.8	47.4	41.8	silty clay	79.9
	15.2-18	8.73	9.48	0.70	7.13	0.32	0.19	14.1		9.6	47.0	43.4	silty clay	90.0
	18-21	8.67	9.48	0.99	9.07	0.41	0.43	14.0		13.6	47.6	38.8	silty clay loam	80.4
	21-23.3	8.60	9.52	1.12	10.63	0.45	0.47	15.7		23.2	43.4	33.4	silty clay loam	60.3
	23.3-27.2	8.76	9.65	0.98	8.90	0.55	0.33	13.4		48.8	25.8	25.4	sandy clay loam	38.4
	27.2-29.1	8.60	9.54	1.06	9.93	0.55	0.14	16.9		21.2	50.0	28.8	clay loam	57.3
	31-33.6	8.74	9.52	1.00	9.33	0.39	0.17	17.6		31.8	36.4	31.8	clay loam	53.5
	33.6-34.9	8.49	9.28	1.01	9.50	0.47	0.06	18.5		26.0	42.6	31.4	clay loam	58.5
	34.9-39.7	8.57	9.52	1.00	9.50	0.61	0.17	15.2		52.2	24.2	23.6	sandy clay loam	32.2
	42-47	8.39	9.10	1.21	9.53	0.93	0.96	9.8		53.2	23.4	23.4	sandy clay loam	34.4
	47-49.8	8.20	8.71	1.30	10.17	1.72	1.13	8.5		30.2	42.6	27.2	sandy clay loam	47.6
	49.8-51	8.32	9.00	1.49	11.90	1.38	1.09	10.7		20.6	45.4	34.0	clay loam	51.6
	51.5-57	8.23	9.07	1.74	13.73	1.44	0.80	13.0		9.4	45.6	45.0	silty clay	70.5
	75-60.6	7.81	9.01	2.25	19.67	1.60	0.95	17.4		13.4	28.2	58.4	clay	82.3
	64-65.2	7.50	8.61	1.30	12.67	0.71	0.37	17.2		20.0	45.6	34.4	silty clay loam	42.4
	114.6-121	8.58	8.94	1.55	14.77	0.59	0.52	19.8		18.0	53.6	28.4	silt loam	43.8



Peter Kiewit Sons' Co. Mining District.  
Report of Laboratory Soil Analysis

Lab. No's. \_\_\_\_\_ Date 9-75 Name \_\_\_\_\_ Decker Coal \_\_\_\_\_ Address \_\_\_\_\_

Comments Surface 21.6 feet was loose, sandy alluvium and driller used mud to maintain circulation.

Sample No.	Sample Interval	pH		Soluble Salts ECx10 <sup>-3</sup>	Sodium meq/l	Calcium meq/l	Magnesium meq/l	SAR	Texture				Saturation %
		Paste	1:5 Diln.						very fine sand	% sand	% silt	% clay	
75-20	21.6-30	8.73	9.07	0.96	8.23	0.51	0.62	10.9		62.0	11.4	26.6	sandy loam 50.6
	40-50	9.14	9.57	0.96	9.03	0.24	0.17	19.9		61.4	11.6	27.0	sandy loam 87.8
	50-58	9.15	9.53	0.72	7.75	0.26	0.19	16.3		59.0	13.6	27.4	sandy loam 89.6
	58-65.6	8.57	9.53	1.13	16.37	0.20	0.16	38.6		19.0	29.0	52.0	clay 134.7
	65.6-70.6	8.78	9.68	1.21	12.36	0.36	0.06	27.0		20.0	38.0	42.0	clay 68.2
	70.6-79.6	8.61	9.67	1.42	14.70	0.22	0.19	32.5		13.8	35.2	51.0	clay 84.5
	76.6-86.6	8.57	9.59	3.00	34.60	1.36	0.06	41.1		13.6	37.6	48.8	clay 83.5
	87.5-91.6	8.53	9.61	1.99	22.50	0.43	0.72	29.7		44.4	25.0	30.6	clay loam 34.2
	91.6-95	8.62	9.62	1.40	16.23	0.40	0.10	32.5		22.0	35.4	42.6	clay 60.8
	95.5-102	8.40	9.40	1.48	14.90	0.47	0.25	24.8		12.8	34.4	52.8	clay 98.0
	102-105	8.06	9.01	2.55	25.50	1.46	0.99	23.0		47.4	21.4	31.2	sandy loam 54.2
	105-108.5	7.54	8.21	3.44	24.00	4.27	4.45	11.5		52.0	20.2	27.8	sandy loam 50.3
	109-115	7.60	8.68	2.48	27.00	1.80	0.84	23.5		19.2	32.6	48.2	clay 110.1
	115-119.3	8.59	9.30	1.53	16.37	0.55	0.06	29.6		22.6	43.8	33.6	clay loam 44.9
	119.3-122.5	8.44	9.30	1.54	16.83	0.61	0.16	27.1		23.2	43.0	33.8	clay loam 37.8
	125-129.7	8.61	9.23	1.32	15.17	0.33	0.27	27.7		18.6	44.6	36.8	silty loam 42.6
	129.7-132	8.44	8.92	1.71	17.87	0.74	0.12	27.3		40.2	32.4	27.4	clay loam 37.7
	132-134.6	7.80	8.48	1.42	15.47	0.10	0.83	22.7		3.6	45.8	22.6	loam 48.6
	185-190.7	8.34	8.70	2.41	26.15	1.80	0.62	23.8		13.6	59.2	27.2	silt loam 33.9



Lab. No's.

## Comments

[illegible]

ANALYSIS OF TRACE ELEMENTS IN OVERBURDEN  
All in Parts Per Million  
(-) Indicates less than given value

Sample Location	Depth	Nitrate Nitrogen	Ammonia Nitrogen	Boron	Selenium	Molybdenum	Mercury	Zinc	Iron	Manganese	Copper	Cadmium	Lead	Nickel
75-18	0' - 5'	0.58	31.11	1.01	-0.02	0.08	0.02	0.9	3.4	2.6	0.6	-0.1	1.3	0.6
75-18	5' - 11' 9"	0.58	32.75	1.68	-0.02	0.07	0.07	0.4	3.8	4.2	0.7	-0.1	1.4	0.4
75-18	11' 9" - 14'	1.73	30.90	0.67	-0.02	0.05	0.11	2.4	5.2	6.5	0.9	-0.1	1.6	0.5
75-18	14' - 15' 2"	1.15	31.52	1.01	-0.02	0.06	0.07	1.8	8.0	5.4	1.1	-0.1	1.2	0.4
75-18	15' 2" - 18'	0.58	30.69	1.34	-0.02	0.53	0.09	4.4	12.0	7.7	1.2	-0.1	1.3	0.8
75-18	18' - 21'	0.00	31.93	1.01	-0.02	0.14	0.09	7.6	41.2	13.0	1.9	-0.1	1.4	3.1
75-18	21' - 23' 3"	0.00	29.25	0.67	-0.02	0.18	0.06	6.1	33.6	6.4	1.5	-0.1	2.3	4.4
75-18	23' 3" - 27' 2"	0.58	31.72	0.34	-0.02	0.13	0.09	3.3	29.2	5.4	0.7	-0.1	1.6	1.2
75-18	27' 2" - 29' 1"	0.00	37.49	1.01	-0.02	0.18	0.02	4.9	30.2	4.0	0.7	-0.1	2.2	1.6
75-18	31' - 33' 6"	0.58	37.29	1.01	-0.02	0.14	0.02	5.2	33.8	3.8	1.0	-0.1	2.2	2.8
75-18	33' 6" - 34' 9"	0.00	39.76	0.34	-0.02	0.30	0.05	5.7	74.4	6.9	1.5	-0.1	2.0	4.3
75-18	34' 9" - 39' 7"	0.00	35.64	0.67	-0.02	0.13	0.04	9.6	43.3	3.1	0.6	-0.1	1.3	2.0
75-18	42' - 47'	0.00	35.84	0.67	-0.02	0.19	0.03	5.4	32.5	4.1	0.7	-0.1	2.0	2.5
75-18	47' - 49' 8"	0.00	44.08	0.67	-0.02	0.35	0.04	7.8	60.8	8.1	1.2	-0.1	2.6	5.4
75-18	49' 8" - 51'	0.58	42.44	0.67	-0.02	0.32	0.02	9.1	66.2	9.9	0.8	-0.1	2.3	3.8
75-18	51' 5" - 57'	0.00	46.76	0.67	-0.02	0.37	0.06	9.6	78.5	11.5	2.6	-0.1	4.0	4.8
75-18	57' - 60' 6"	0.58	61.39	1.34	-0.02	0.35	0.10	11.6	72.5	17.8	4.7	-0.1	5.8	9.2
75-18	64' - 65' 2"	0.00	47.38	1.34	-0.02	0.13	0.04	3.2	33.8	4.3	3.0	-0.1	2.1	1.5
75-18	114' 6" - 121'	0.00	37.08	1.01	-0.02	0.14	0.04	9.6	61.2	4.3	1.8	-0.01	1.6	2.9
75-20	21' 6" - 30'	0.00	35.02	1.01	-0.02	0.14	0.02	2.0	16.2	3.3	1.0	-0.1	1.7	3.5
75-20	40' - 50'	0.00	60.77	1.34	-0.02	0.13	0.02	1.8	23.2	2.9	0.8	-0.1	2.5	3.8
75-20	50' - 58'	0.58	53.77	1.01	-0.02	0.08	0.02	1.9	33.0	2.4	0.8	-0.1	3.0	2.0
75-20	58' - 65' 6"	0.58	80.75	1.34	-0.02	0.08	0.02	7.0	60.5	2.2	3.6	-0.1	2.9	6.7
75-20	65' 6" - 70' 6"	0.58	63.65	1.01	-0.02	0.16	0.04	8.0	47.3	2.5	2.6	-0.1	4.4	4.9
75-20	70' 6" - 79' 6"	1.15	67.36	2.35	0.02	0.17	0.07	7.1	97.0	6.2	2.8	-0.1	3.6	6.2
75-20	79' 6" - 86' 6"	0.58	78.07	1.68	-0.02	0.08	0.05	6.8	124.0	8.6	3.0	-0.1	3.9	6.3
75-20	87' 5" - 91' 5"	0.58	46.35	0.00	-0.02	0.16	0.04	3.7	65.1	5.4	0.9	-0.1	2.1	3.2
75-20	91' 5" - 95' 0"	0.00	61.39	1.68	0.02	0.17	0.06	6.6	92.2	8.4	1.7	-0.1	3.9	5.6
75-20	95' 5" - 102'	0.58	84.05	1.34	-0.02	0.16	0.06	4.4	69.1	5.9	3.2	-0.1	2.1	6.0
75-20	102' - 105'	0.58	48.00	2.01	-0.02	0.21	0.04	3.3	49.4	6.5	1.5	-0.1	1.0	4.9
75-20	105' - 108' 4"	0.58	40.58	0.67	-0.02	0.13	0.05	2.3	40.2	8.9	1.5	-0.1	0.7	4.3
75-20	109' - 115'	0.58	69.63	1.68	-0.02	0.24	0.06	6.1	70.6	9.0	4.3	-0.1	3.3	7.7
75-20	115' - 119' 3"	0.58	42.44	0.67	0.02	0.11	0.04	5.5	58.2	7.7	2.5	-0.1	3.2	3.7
75-20	119' 3" - 122' 5"	0.00	40.99	0.67	-0.02	0.24	0.08	6.2	33.4	7.4	2.5	-0.1	3.7	4.2
75-20	125' - 129' 7"	0.58	42.85	0.34	-0.02	0.19	0.03	4.2	70.7	10.9	2.4	-0.1	3.3	4.4
75-20	129' 7" - 133' 2"	0.58	35.43	0.00	-0.02	0.18	0.03	3.7	33.8	5.5	0.8	-0.1	2.6	2.2
75-20	133' 2" - 134' 6"	0.58	44.70	0.34	-0.02	0.00	0.09	2.7	41.2	2.7	3.4	-0.1	1.8	3.1
75-20	134' 6" - 190' 7"	0.58	37.08	0.34	-0.02	0.00	0.03	6.2	92.6	2.8	3.3	-0.1	—	3.4
75-20	190' 7" - 194' 5"	0.58	40.99	0.00	-0.02	0.08	0.03	10.1	76.0	2.3	4.0	0.11	2.0	4.0



APPENDIX II

Frequency (by species), Canopy Coverage (by species)

and

Standing Crop

For The

Three Major Vegetation Communities

In The

West Decker Mine Area



WEST DECKER  
MID-SHORT GRASS PRAIRIE TYPE  
FREQUENCY AND CANOPY COVERAGE BY SPECIES

Species Symbol	Raw Frequency	Percent Frequency	Total Canopy Coverage cm <sup>2</sup> x1000	Percent Canopy Coverage
1. CA LO	14	23.30	4,150	6.90
2. AN SC	41	68.30	9,425	15.70
3. CA FI	48	80.00	8,850	14.80
4. FO CE	1	1.70	100	.20
5. PH HO	12	20.00	900	1.50
6. CH VI	5	8.30	500	.80
7. BO GR	11	18.30	1,575	2.60
8. VU OC	4	6.70	500	.80
9. AG SP	8	13.30	1,350	2.30
10. AS MO	6	10.00	525	.90
11. HE HI	1	1.70	100	.20
12. BO CU	6	10.00	1,300	2.20
13. KO CR	6	10.00	525	.90
14. LE DE	8	13.30	650	1.10
15. LI PU	1	1.70	100	.20
16. AR NO	1	1.70	100	.20
17. AN RO	6	10.00	775	1.30
18. AM CA	2	3.30	250	.40
19. BR JA	8	13.30	625	1.00
20. AR HO	1	1.70	100	.20

	Species Symbol	Raw Frequency	Percent Frequency	Total Canopy Coverage cm <sup>2</sup> x1000	Percent Canopy Coverage
21.	ST CO	1	1.70	100	.20
22.	PO PR	1	1.70	200	.30
23.	ER PO	2	3.30	300	.50
24.	AR TR	1	1.70	100	.20
25.	AR LU	6	10.00	825	1.40
26.	SI CO	4	6.70	475	.80
27.	AR LO	3	5.00	525	.90
28.	AG AL	3	5.00	550	.90
29.	PE	1	1.70	25	.042
30.	AS SPP	2	3.30	375	.60
31.	VU OC	3	5.00	350	.60
32.	CE SPP	2	3.30	100	.20



WEST DECKER  
RIPARIAN SHRUB-GRASSLAND TYPE  
FREQUENCY AND CANOPY COVERAGE BY SPECIES

Species Symbol	Raw Frequency	Percent Frequency	Total Canopy Coverage cm <sup>2</sup> x1000	Percent Canopy Coverage
1. AG SM	15	75.00	7,700	38.50
2. LE DE	5	25.00	450	2.30
3. BR JA	12	60.00	1,500	7.50
4. ST VI	15	75.00	4,100	20.50
5. PO PR	1	5.00	100	.50
6. AR TR	2	10.00	1,700	8.50
7. HE AN	3	15.00	300	1.50
8. AR CA	7	35.00	2,700	13.50
9. HE HI	2	10.00	200	1.00

WEST DECKER  
SAGEBRUSH STEPPE TYPE  
FREQUENCY AND CANOPY COVERAGE BY SPECIES

Species Symbol	Raw Frequency	Percent Frequency	Total Canopy Coverage cm <sup>2</sup> x1000	Percent Canopy Coverage
1. BR JA	53	66.30	30,075	37.60
2. BO GR	37	46.30	8,950	11.20
3. PI. SPP	7	8.80	400	.50
4. OP PO	10	12.50	1,075	1.30
5. LE DE	22	27.50	1,685	2.10
6. AG SM	44	55.00	5,850	7.30
7. SP ER	1	1.30	100	.10
8. VU OC	5	6.30	350	.40
9. ST CO	38	47.50	11,300	14.10
10. BR TE	4	5.00	275	.30
11. PO SE	1	1.30	50	.10
12. AR TR	26	32.50	9,500	11.90
13. CA FI	20	25.00	2,550	3.20
14. PO AR	5	6.30	500	.60
15. HE HI	13	16.30	1,450	1.80
16. LE PI	2	2.50	100	.10
17. CA MI	3	3.80	250	.30
18. KO CR	7	8.80	950	1.20
19. AR LO	4	5.00	450	.60
20. AN RO	3	3.80	800	1.00

Species Symbol		Raw Frequency	Percent Frequency	Total Canopy Coverage cm <sup>2</sup> x1000	Percent Canopy Coverage
21.	OE CA	1	1.30	100	.10
22.	CA LO	1	1.30	200	.30
23.	SA CO	2	2.50	75	.10
24.	AR HO	2	2.50	200	.30
25.	PH HO	1	1.30	100	.10
26.	ER PO	1	1.30	100	.10
27.	LY SP	3	3.80	300	.40

Standing Crop  
Field Weight in Pounds Per Acre

Transect Designation	Annual Grasses	Perennial Grasses and Grasslike	Forbs	Shrubs	Annual Shrub Growth (Leaders)
MSG 1W	33.0	605.7	149.7	0	0
MSG 2W	4.4	621.1	292.9	0	0
MSG 3W	0	275.3	140.9	0	0
$\bar{X}$ Type Standing Crop	12.5	500.7	194.5	0	0
SBS 1W	361.2	1107.9	693.8	0	0
SBS 2W	68.2	660.7	599.1	1922.9	66.0
SBS 3W	33.0	508.8	273.1	2136.5	68.2
SBS 4W	81.4	825.9	669.6	156.3	19.8
$\bar{X}$ Type Standing Crop	135.9	775.7	558.9	1053.9	38.5
RSG 1W	277.5	2026.4	312.7	3427.3	1039.6